# CENTER FOR BEAM PHYSICS SEMINAR

## "Time Resolved X-ray Diffraction"

Dr. Antoine Rousse
LOA - ENSTA, France

Friday, October 26, 2001, 10:30 AM
Bldg. 71 Albert Ghiorso Conference Room, LBNL

Abstract:

The Laboratoire d'Optique Appliquee (LOA) is a European Laser Large Scale Facility and runs laser systems with very high peak powers up to 100 TW (2.5 J, 25 fs, 10 Hz) and high repetition rates (7 mJ, 40fs, 1 kHz). These systems allow the investigation of new domains of strong field physics such as High Harmonic generation, laser-assisted nuclear physics, production of ultra fast X-rays by non-linear Thomson scattering, generation of x-ray lasers and Neutron production. The significant results recently obtained in these field (1) will be discussed as well as the oncoming experiments scheduled in the Facility. In particular, the achievements obtained on the X-ray generation part have launched a program on the application of ultrafast X-rays to the analysis of femtosecond atomic motions in condensed matter physics and biochemistry. The results obtained at LOA in this emerging field will be discussed (2-4).

(1) S. Sebban et al, Phys. Rev. Lett. 86 (14), 3004-3007 (2001)
(2) C. Rischel, A. Rousse, I. Uschmann, et al.: Nature 390, 490 (1997).
(3) A. Rousse, C. Rischel, S. Fourmaux, I. Uschmann, et al.: , Nature 410 (6824), 65-68 (2001)
(4) A. Rousse, C. Rischel and J.C. Gauthier, Rev. Mod. Phys. 73 (1) (2001)

Biographical and Educational data:

Antoine Rousse, born in 1965, has a PhD in Plasma Physics from the University of Orsay Paris XI in France (1994). He spent one year at the Institute of Physical and Chemical Research (RIKEN) in Tokyo (Japan, 1995). He's now senior researcher at the L.O.A. European facility. He's involved on the study of ultrashort and intense laser-matter interactions. He leads a project at the L.O.A. of ultrabright and short X-ray pulse generation and applications. He's developing a scheme of femtosecond time-resolved x-ray diffraction on organic and protein sample using these incoherent flash X-rays (l ~ Å). He's also working on the possibility to produce femtosecond coherent flash X-rays at wavelengths shorter than 10 Å.

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